NEOTROPICAL BIOLOGY AND CONSERVATION

Neotropical Biology and Conservation
15(3): 351–357 (2020)
doi: 10.3897/neotropical.15.e51815

SHORT COMMUNICATION

Filling gaps in the southern range of the endangered snake *Philodryas agassizii*: new localities in Tandilia highland grassland, Argentina

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Academic editor: A. M. Leal-Zanchet | Received 6 March 2020 | Accepted 31 July 2020 | Published 18 August 2020

Citation: Vera DG, Berkunsky I, Tettamanti G, Eirin M, Kacoliris FB, Di Pietro DO (2020) Filling gaps in the southern range of the endangered snake *Philodryas agassizii*: new localities in Tandilia highland grassland, Argentina. Neotropical Biology and Conservation 15(3): 351–357. https://doi.org/10.3897/neotropical.15.e51815

Abstract

Philodryas agassizii is an endangered snake of shrubland and grasslands well preserved in Argentina, Paraguay, Brazil, and Uruguay. In the southeastern area of its range, this snake was only found associated with highland grassland of the Tandilia and Ventania mountain systems, Argentina. In this work, we described six new records of *Philodryas agassizii* from the Tandilia Mountain System, which represent four new localities for the species. These records extend the known range of *Philodryas agassizii* in the Tandilia mountain system, 100 km from the closest previously known site.

Keywords

geographic distribution, grasslands, snakes

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PENSOFT

Philodryas agassizii (Jan, 1863) is a habitat specialist snake occurring in Atlantic forest, Cerrado, Pampa and Pantanal biomes from the center of Argentina, through Uruguay, Paraguay and Brazil (Peters and Orejas-Miranda 1970; Viñas 1985; Cei 1993; Carreira et al. 2005; Marques et al. 2006; Etchepare and Ingaramo 2008; Ghizoni et al. 2009; Hamdan and Lira-da-Silva 2012; Di Pietro et al. 2013; Smith and Clay 2015; Cacciali et al. 2016; Costa and Bérnils 2018; Ríos et al. 2020). *Philodryas agassizii* is prevalent in well preserved natural grasslands with dense coverage of native grass (Marques et al. 2006; Etchepare et al. 2012). Even when this snake had a large range, which includes many Argentine provinces, the current number of reported specimens remains low (Di Pietro et al. 2013). The southernmost record of this snake is in Río Negro province, Argentina (Perez et al. 2012). Natural grasslands of southern South America are among the most fragmented and disturbed ecosystems, and this could be one of the main reasons for the rarity of this snake (Giraudo et al. 2011). While at the international level, the conservation status of *Philodryas agassizii* was not evaluated, this snake was listed as Endangered in the Argentinean and the Paraguayan Red Lists (Motte et al. 2009, Giraudo et al. 2012). In Brazil, some authors proposed the use of *Philodryas agassizii* as a potential bioindicator for the Pampa biome, as well as the inclusion of *Philodryas agassizii* in the Brazilian list of threatened vertebrates (Winck et al. 2007).

In its southern range, in Buenos Aires province, *Philodryas agassizii* was only reported in highland grasslands of the two mountain systems of the Pampa ecoregion: Tandilia and Ventania (Viñas et al. 1989; Vega and Bellagamba 1990; Di Pietro 2016). These mountain systems conserve remnants of native grassland, and maintain a high number of endemic plants and animal taxa, so they are considered orographic islands (Crisci et al. 2001). In this work, we described six new records of *Philodryas agassizii* in the Tandilia mountain system.

For each record, we provided geographic location, elevation, photographs, a description of the habitat, and, whenever possible, sex and morphometric traits. We examined specimens with a binocular microscope to count the number of scales to gauge its taxonomic determination. We used a GPS (Garmin Etrex 20) to record elevation and geographic location (Datum WGS84) of each specimen. We used a digital caliper to measure morphometric lengths (i.e., head, snout-vent, tail and total lengths) and we used a digital scale (nearest to 0.1 g) to obtain the body mass. We determined the sex of each specimen based on measurements and following the sexual dimorphism established by Di Pietro et al (2013). Collected specimens and photo-vouchers were sent to the Colección Herpetológica del Museo de La Plata (MLP) that provided us collection numbers for collected specimens, and photo collection numbers for the photographed specimens. This study required collecting authorization, which was provided by Dirección de Flora y Fauna de la provincia de Buenos Aires (NO-2019-16058740-GDEBA-DFYFMAGP).

We identified the specimens by their color pattern and scale counting. All specimens have 13 dorsal scale rows, a diagnostic feature of *Philodryas agassizii* (Jan, 1863). All specimens showed greenish color with yellowish tones. Some specimens (Fig. 1A, C, D) had a clear brownish-reddish longitudinal band on the back.

Figure 1. Photographic records of *Philodryas agassizii* in the Tandilia Mountain System, Argentina. Specimens from Estancia Ninonil (**A**), Estancia Rucahué (**B**), Estancia Las Mercedes (**C–E**), and Estancia El Bonete (**F**).

Table 1. Morphometric traits of four specimens of *Philodryas agassizii* found in the Tandilia Mountain System, Argentina.

Specimen (photo)	Locality	Length (mm)				Mass (g)
		Snout-vent	Head	Tail	Total	
MLP, R. 6761 (1C)	Ea. Las Mercedes	161.7	7.89	52.2	213.9	3.8
MLP, cf. 0051 (1D)	Ea. Las Mercedes	190.0	8.85	45.8	235.8	5.5
MLP, cf. 0052 (1E)	Ea. Las Mercedes	289.0	10.48	108.8	397.8	7.8
MLP, R. 6762 (1F)	Ea. El Bonete	405.0	13.65	117.5	522.5	31.6

October 19th 2017 (13:27 h), we found one specimen of *Philodryas agassizii* (MLP, cf. 0053) in a highland grassland with bare soil patches at Estancia Ninonil, Partido de Tandil (37°37.6144'S, 59°13.9012'W; 342 masl; Fig. 1A). The habitat was dominated by native grass and a few patches of native shrubs (mainly *Colletia paradoxa* and *Baccharis tandiliensis*). This specimen was released and no morphological measures were taken.

December 7th 2017 (09:08 h), we found one specimen of *Philodryas agassizii* (MLP, cf. 0054) on a road immersed in a highland grassland at Estancia Rucahué, Partido de Tandil (37°28.6316'S, 59°3.3116'W; 205 masl; Fig. 1B). The habitat was a highland grassland dominated by native grasses (*Nessiana*, and *Piptochaetium*). This specimen was released and no morphological measures were taken.

Between November 2019 and January 2020, we found three specimens of *Philodryas agassizii* at highland grassland in Estancia Las Mercedes, Partido de Tandil. The habitat was dominated by native grass (genus *Nessiana*, *Piptochaetium*, and *Paspalum*) and large patches of native shrubs (*Baccharis tandiliensis* and *Eupatorium bunifolium*). Rocky outcrops and loose rocks were frequent in the area. Livestock was of low density and woody invasive species were scarce at the site. We found all specimens under rocks (Table 1). November 9th, 2019 (11:50 h), we collected one juvenile specimen (MLP, R. 6761, Fig. 1C; 37°22.645'S, 59°05.355'W; 252 masl). We found another two specimens, and both were measured in the field and then released. December 5th, 2019 (14:43 h) we found a second juvenile specimen (MLP, cf. 0051, Fig. 1D; 37°22.656'S, 59°05.378'W; 251 masl), and January 24th, 2020 (09:57 h) we found a male specimen (MLP, cf. 0052, Fig. 1E; 37°22.708'S, 59°05.289'W; 245 masl).

December 21th 2019 (12:50 h), we found one adult female of *Philodryas agassizii* (MLP, R. 6762, Fig. 1F, Table 1) in highland grasslands with bare soil patches at Estancia El Bonete, Partido de Lobería (37°52.264'S, 58°38.802'W; 218 masl). The habitat was a highland grassland dominated by native grasses (genus *Nessiana*, *Piptochaetium*, and *Paspalum*) and patches of native shrubs (mainly *Colletia paradoxa* and *Baccharis tandiliensis*). Rocky outcrops were frequent, and some remnants were affected by the colonization of woody invasive vegetation. Livestock density was low in this grassland remnant. This specimen was collected.

These six new records resulted in four new localities in the geographic range of *Philodryas agassizii* (Fig. 2, modification of Griffith et al. 1998). These new localities extend the range of this snake along the Tandilia mountain system, 100 km to the

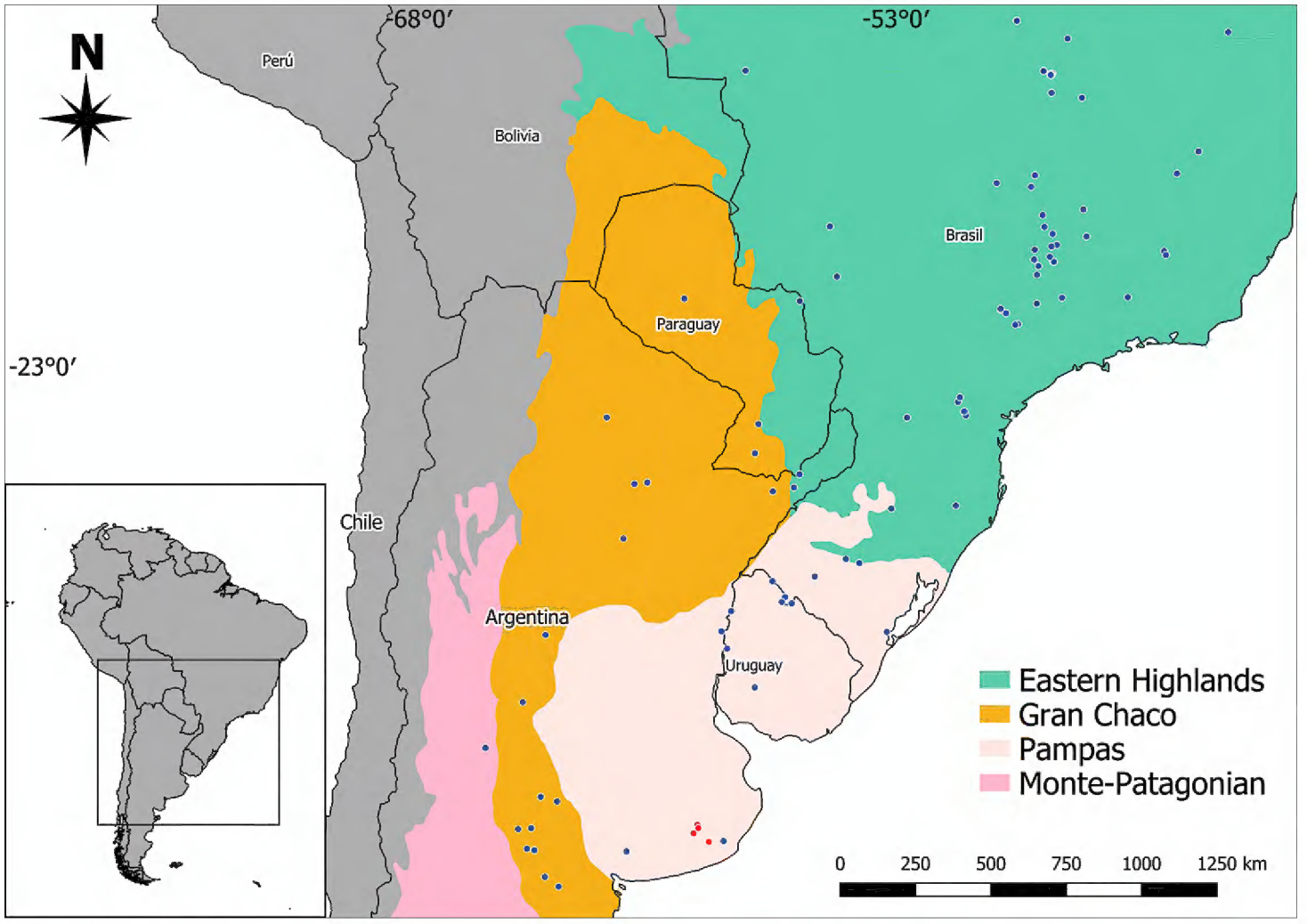

Figure 2. Geographic distribution of *Philodryas agassizii*. The map includes ecoregions of South America by Griffith et al. (1998). The blue circles indicate the previous records, and the red circles indicate new records.

northwest from the closest previously known site (i.e., Sierra del Volcán, Balcarce; Vega and Bellagamba 1990), and help to fill one of the gaps of the geographic distribution of the species in the Pampean region of Argentina. Our records will contribute to better understand the distribution of *Philodryas agassizii* in the region, reinforcing the idea that the species is occurring in relatively well conserved grasslands.

Acknowledgments

We would like to thank field assistants and collaborators (Clara Fiorino Falasco, Gonzalo Adrián Reuter, Florencia Débora Dosil Hiriart, María Florencia Aranguren, Pilar Plantamura and Scarlett Mendez Herrera) for their kind assistance and support during the fieldwork activities. We also appreciate the collaboration of Tomas Pérez Marino (Estancia El Bonete), Paulo Mosca (Estancia Ninonil), and Federico Juana (Estancia Las Mercedes) for allowing entry into their properties. Jorge Williams made valuable suggestions for improving this manuscript. The Dirección de Fauna Silvestre of the Buenos Aires Province gave us authorization to perform this work.

We greatly aknowledge two anonymous reviewers whose comments improve our works.

This study was supported by the Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET PIP. 11220150100598CO), the Agencia Nacional de Promoción Científica y Tecnológica (ANPCYT, PICT 2015-2281), and the Neotropical Grassland Conservancy (STUDENT GRANT PROGRAM 2019).

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